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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/751,312	01/02/2004	Josehp J. Schottler	P06708US0-6025	2007

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EXAMINER	
HOLMES, MICHAEL B	

ART UNIT	PAPER NUMBER
2121	

MAIL DATE	DELIVERY MODE
12/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/751,312	SCHOTTLER ET AL.	
	Examiner	Art Unit	
	Michael B. Holmes	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *(3)* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *7* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 & 8-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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Examiner's Detailed Office Action

1. This Office Action is responsive to communication received on 11/19/2007.

2. Amendment under 37 CFR § 1.111 reconsideration and allowance of application is respectfully requested by applicant. Applicant has failed to overcome the cited references. Moreover, applicant's arguments have been fully considered, however, they are *not* persuasive. The rejection under 35 U.S.C. § 103(a) stands. The complete text has been included below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-4 & 8-10 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over McCormick (USPN 5,012,722) in view of Tracy et al. (USPN 7,247,955) further in view of Shimamori (USPN 6,204,650).

Regarding claims 1, 8 & 9.

McCormick teaches a method of driving the coil of an electrohydraulic [Abstract, FIG. 3] valve with a pulse width modulator (PWM) drive [FIG. 3], [see further Col. 5, Lines 14-27 & Col. 4, Lines 49-64] comprising:

transmitting a feedback signal to a digitizing device that is electrically connected to the electrohydraulic valve; [Col. 7, Lines 12 - 39, Fig. 8 applying the selected signal to ADC via analog line]

sampling the feedback signal within the digitizing device to create a plurality of signal samples within one pulse width modulator cycle;

transmitting the plurality of samples to an accumulator; [loop controller receives control information indicating a desired operation of the hydraulic valve through control input, and feedback information indicating the state of various elements in the servo loop, Col. 5, Lines 16- 20]

averaging the plurality of samples within the accumulator to create an average value; and

transmitting the average value to a closed loop control algorithm that generates a pulse width signal to drive the coil of the electrohydraulic valve;

wherein the accumulator resets when the algorithm sends the pulse width signal to the coil of the electrohydraulic valve such that the method of driving the coil of an electrohydraulic valve with a pulse width modulator drive starts over again for a next pulse width modulator cycle; calculating an average current in the signal within one pulse modulator cycle with the finite impulse response filter.

McCormick does not teach sampling the feedback signal within the digitizing device to create a plurality of signal samples within one pulse width modulator cycle; averaging the plurality of samples within the accumulator to create an average value; and transmitting the average value to a closed loop control algorithm that generates a pulse width signal to drive the coil of the electrohydraulic valve; wherein the accumulator resets when the algorithm sends the pulse width signal to the coil of the electrohydraulic valve such that the method of driving the coil of an electrohydraulic valve with a pulse width modulator drive starts over again for a next pulse width modulator cycle; calculating an average current in the signal within one pulse modulator cycle with the finite impulse response filter; and a finite impulse filter (FIR).

Tracy et al. teaches sampling the feedback signal within the digitizing device to create a plurality of signal samples within one pulse width modulator cycle; [Col. 5, L 24-45 the feedback path includes an A/D converter] averaging the plurality of samples within the accumulator to create an average value; [FIG.6, the finite impulse response (FIR) filter may be a low pass averaging filter that averages the samples for several consecutive periods, Col. 5, Lines 24-45] and transmitting the average value to a closed loop control algorithm that generates a pulse width signal to drive the coil of the electrohydraulic valve; [the filtered output of the (FIR) filter is converted to a space vector coordinate domain by a space vector conversion algorithm, FIG. 6, Col. 5, L 24-49] calculating an average current in the signal within one pulse modulator cycle with the finite impulse response filter. [FIG. 6, Col. 5, L 24-49] It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to combine McCormick and Tracy et al. because Tracy et al. relates to power conversion apparatus and

methods, and more particularly, to power supply apparatus and methods of operating the same.

McCormick and Tracy et al. do not teach the accumulator resets.

Shimamori teaches the accumulator resets. ['initialization' includes the initialization of each type of register, the setting of a timer (setting the sampling cycle shown in FIG. 18), the setting of an interrupting process, the setting of the PWM unit 11, etc. The setting of the PWM unit 11 includes a process of writing a predetermined value to the cycle register 61, and a process of resetting the ON-time register, Col. 14, Lines 19- 27] for the purpose of initialization of each type of register, Col. 14, lines 19- 27] It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to combine McCormick and Tracy et al. with Shimamori because Shimamori relates to a power supply apparatus provided with a power supply circuit for generating a DC output.

Regarding claim 2.

McCormick teaches the method of claim 1 wherein the digitizing device is an A/D converter.

[FIG. 8, C 7, L 12 – 61]

Regarding claim 3.

McCormick teaches the method of claim 1 wherein the digitizing device is a DSP.

[FIG. 8, C 7, L 12 – 61]

Regarding claim 4.

McCormick teaches the method of claim 1 wherein the digitizing device is a micro controller.

[FIG. 8, C 7, L 12 – 61]

Regarding claim 10.

Tracy et al. teaches the method of claim 1 wherein the digitizing device is a finite impulse response filter (FIR). [Col. 5, L 24-45]

5. Claims 5 & 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCormick (USPN 5,012,722) in view of Tracy et al. (USPN 7,247,955) further in view of Shimamori (USPN 6,204,650) further still in view of Bergstrom (USPN 6,249,418). McCormick, Tracy et al. & Shimamori have been discussed above and do not explicitly teach the limitations embodied in claims 5 & 6.

Bergstrom teaches the limitations embodied in claims 5 & 6.

Regarding claims 5.

The method of claim 1 wherein the algorithm is a PI algorithm.

Regarding claims 6.

The method of claim 1 wherein the algorithm is a PID algorithm.

The method of claim 1 wherein the algorithm is a PI algorithm and a PID algorithm. [note, per applicant's own admission ... specification (page 4) "The closed loop control algorithm in a preferred embodiment preferably would be a PI or PID ... of which, examiner interprets Bergstrom teachings as "the controller design can be done using any of the standard closed loop controller design methods in existence" e.g., PI & PID, Col. 9, Lines 63 - 65] It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to combine McCormick, Tracy et al., and Shimamori with Bergstrom because Bergstrom provides for the control of the position of, or force on an electromagnetic actuator using the minimum possible

amount of information from the system i.e., this is a system driving a coil with a voltage (a duty cycle or pulse width modulated (PWM) driven system) and measuring just the current that flows through the coil.

Regarding claim 7. (cancelled)

Response to Argument(s)

6. Applicant argues:

Shimamori does not accumulator reset i.e., "wherein the accumulator resets when the algorithm sends the pulse width signal to the coil of the electrohydraulic valve such that the method of driving the coil of an electrohydraulic valve with a pulse width modulator drive starts over again for a next pulse width modulator cycle."

Examiner disagrees:

Shimamori teaches a pulse generator termed an accumulator reset triggered by a pulse signal cycling through PWM unit until a predetermined value e.g., a counter is met or a time point, at which, the counted or timer would re-initialized to the starting point or zero. One of ordinary skill in the art would know that such a process may be made up of commercially available logic gates appropriately connected. Moreover, McCormick teaches an electrihydraulic valve process.

Applicant argues:

MoCormick does not teach averaging.

Examiner agrees:

Tracy et al. teaches averaging. [see FIG. 6, Col. 5, L 24-49]

Applicant argues:

Calculating the amount of average current i.e., "averaging of current not voltage ... "

Examiner disagrees:

referring back to the basics ...

Ohm's law states that, in an electrical circuit, the current passing through a conductor, from one terminal point on the conductor to another terminal point on the conductor, is directly proportional to the potential difference (i.e. voltage drop or voltage) across the two terminal points ...

In other words, the statement of relationship between current, voltage, and resistance. Where I = Current, E = Voltage, and R = Resistance, I=E/R, E=IR, and R=E/I. The equation for calculating resistance in series is R 1 + R 2 + ... + R n = R total . ...

Examiners Summary

7. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

8. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence Information

9. Any inquires concerning this communication or earlier communications from the examiner should be directed to Michael B. Holmes, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-3686 or facsimile transmission (571) 273-3686 or email michael.holmesb@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.

If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, Anthony Knight, may be reached at (571) 272-3687.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Finally, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Moreover, status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) toll-free @ 1-866-217-9197.

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